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Mine Pillar Study: Understanding Rock Stability in Potash Mining

The University of Saskatchewan is leading a collaborative research project aimed at improving the understanding of how underground potash mines respond to excavation. As potash mining moves into deeper and more geologically varied areas, it's crucial to ensure that mine designs remain safe, effective, and sustainable under these new conditions.

Why This Matters

Potash in Saskatchewan is mined from deep underground salt formations known as evaporites. These rocks behave in complex ways when excavated — their response can be time-dependent, non-linear, and influenced by factors like geology, mining method, and ground support. Mining occurs at depths where the stress caused by excavation can exceed the rock's strength, creating a narrow zone of brittle fracturing around mine openings. Beyond this, the rock deforms more gradually in a ductile manner over time — a behavior that must be understood and managed to maintain long-term stability

A Strong Foundation, Moving Forward

Saskatchewan has a decades-long track record of safe and effective potash mining. Operators have developed practical methods to manage rock behavior, resulting in stable underground workings. This new study builds on that foundation, aiming to improve our understanding of rock mechanics under evolving mining conditions.

Project Objectives

- Link mining activities and instrumentation data to key mechanical processes such as stress change, deformation, rock failure, and material properties changes.
- Evaluate and recommend monitoring technologies suited to different mining and geological conditions.
- Enhance Canada's capacity for rock mechanics research in potash mining by training a Saskatchewan-based Ph.D.-level expert in the field.

This work will help develop best practices for selecting and using monitoring tools and interpreting data to support safe, informed mine design in the future.

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Hands-On Research and Collaboration

The project will be carried out in close partnership with potash producers and is supported by national research programs, including Mitacs Accelerate and NSERC Alliance. Researchers will work with industry partners to select and study several underground mine sites, installing advanced instrumentation to monitor stress, deformation, and microseismic activity.

Proponent: University of Saskatchewan

Project Duration: October 2024 to April 2028

Project Cost & Contributions:	$462,587
Industry:	$203,667
Mitacs/NSERC:	$225,000
U of S:	$ 33,920